

Claims

CLAIM 1. Apparatus for alleviating condensation in a double-glazed window, wherein:
the apparatus includes:-

- two panes of glass, and a spacer structure for holding the panes apart in a parallel, spaced-apart relationship, whereby the panes define a between-panes vault;
- a spacer structure, which defines a periphery or circumference of the between-panes vault;
- sealing means, for sealing the panes of glass to the spacer structure, around the periphery of the vault, whereby a pressure differential can exist between the pressure of air inside the vault and the pressure of air outside the vault;
- a valve assembly, which includes a closure member, a seating, and a passageway for transference of air between the vault and the air outside the vault;

the valve assembly is operable between a closed condition and an open condition;

in the open condition, the closure member is out of sealing contact with the seating, whereby the passageway is open to the transference of air between the vault and the air outside the vault;

in the closed condition, the closure member makes sealing contact with the seating, whereby air cannot pass through the passageway between the vault and the air outside the vault;

the apparatus includes a valve operator, which is effective to operate the valve between the closed condition and the open condition; and

the operator is effective to operate the valve in response to a change in the pressure differential between the air in the vault and the air outside the vault.

Claim 2. Apparatus of claim 1, wherein the passageway is so wide open, in the open condition, that any pressure differential that might be present between the air in the vault and the air outside the vault dissipates substantially instantaneously, due to transference of air into or out of the vault, through the wide-open passage.

Claim 3. Apparatus of claim 2, wherein the valve assembly lies assembled in a through-hole in one of the glass panes, and the through-hole has a diameter of not less than about five mm.

Claim 4. Apparatus of claim 3, wherein the through-hole has a diameter of not more than about twenty mm.

Claim 5. Apparatus of claim 1, wherein the valve is of a normally-open configuration, in that

the valve is structured to remain in the open condition when the said pressure differential is zero or nearly zero.

Claim 6. Apparatus of claim 5, wherein the operator is effective to operate the valve to the open condition when the pressure inside the vault is higher than the pressure outside the vault.

Claim 7. Apparatus of claim 6, wherein the operator is effective to operate the valve to the closed condition when the pressure inside the vault is lower than the pressure outside the vault.

Claim 8. Apparatus of claim 7, wherein:
the valve assembly is of a normally-open check-valve configuration;
the operator includes a spring; and
the spring acts upon the closure member in such directional sense as to urge the closure member clear of the seating.

Claim 9. Apparatus of claim 8, wherein:
the spring exerts such force as to close the valve when the pressure inside the vault is lower than the pressure outside the vault, and the magnitude of the pressure differential exceeds P pascals; and
the magnitude P is more than five pascals;
whereby the valve remains open while the pressure differential is less than five pascals, and/or while the pressure inside the vault is higher than the pressure outside the vault.

Claim 10. Apparatus of claim 9, wherein the spring exerts such force that the magnitude P is less than one hundred, and preferably is less than fifty, pascals.

Claim 11. Apparatus of claim 8, wherein:
the valve assembly includes a filter screen;
the filter screen has a mesh pitch of about fifty by fifty holes per inch, or finer;
the filter screen is affixed into a housing of the valve assembly, and is so located as to prevent particles from outside the vault from reaching the spring, the closure member, and the seating.

Claim 12. Apparatus of claim 1, wherein:

the window separates a room in a building from the atmosphere outside the building;
the building is located where the average atmospheric temperature, year round, is less than twenty degC; and
the valve assembly is so oriented as to create the said passageway between the vault and the outside atmosphere.

Claim 13. Apparatus of claim 1, wherein:

the window separates a room inside a building from the atmosphere outside the building;
the building is located where the average atmospheric temperature, year round, is more than twenty degC; and
the valve assembly is so oriented as to create the said passageway between the vault and the inside room.

Claim 14. Apparatus of claim 3, wherein:

the window separates a room inside a building from the atmosphere outside the building;
the window is so oriented that one of the panes is an outside pane, being the one of the panes that is in contact with the atmosphere outside the building, and the other of the panes is an inside pane;
the through-hole in which the valve assembly lies assembled is a through-hole in the outside pane;
the inside pane is provided with an inside-pane-through-hole;
the inside-pane-through-hole is aligned with the through-hole in the outside pane to the extent that both holes can be drilled from inside the room;
the through-hole, the valve assembly, and the inside-pane-through-hole are so dimensioned that the valve-assembly can be passed through the inside-pane-through-hole, and can be inserted into the through-hole in the outside pane, from the room;
the apparatus includes an inside-pane-plug, which lies inserted into the inside-pane-through-hole;
the inside-pane-plug provides an airtight seal between the air in the vault and the air in the room.

Claim 15. Apparatus of claim 8, wherein:

the spring of the valve assembly includes a domed diaphragm, made of elastomeric material;
the closure member comprises a ring of the domed diaphragm;
the domed diaphragm is capable of flipping inside out, when subjected to a pressure differential in the direction in which pressure in the vault is lower than pressure outside

the vault;

and is capable thereby of moving to a position in which the ring abuts the seating, thereby blocking air from passing into the vault.

Claim 16. Apparatus of claim 8, wherein the spring of the valve assembly includes a wire coil spring, made of a non-corroding metal.

Claim 17. Apparatus of claim 8, wherein the spring of the valve assembly includes at least one resiliently-deflectable leaf of plastic material.

Claim 18. Apparatus of claim 1, wherein the window is one in which the between-panes vault was formerly sealed airtight, until the provision of the said through-hole in the glass pane, and in which desiccant material housed in the vault is saturated or almost saturated with water.

Claim 19. A procedure for remediating a double-glazed window, including:

providing the apparatus of claim 1;

then removing accumulated moisture from the between-panes vault;

then blowing pre-dried air into the vault;

where the said air has been pre-dried to the extent that its dewpoint is twenty centigrade degrees below the dewpoint of the air outside the vault.